

Claims

1. Process for synchronization in a communication network comprising at least two buses interconnected by a wireless communication network, each bus being linked to the wireless communication network by a portal, the said process being characterized in that it comprises the steps:
- of determining a so-called cycle server portal whose own clock will serve as reference for the other portals;
 - of transmitting, via each portal, a synchronization signal at a predetermined instant with respect to the start of a frame and characteristic of each portal, the said frame being defined with respect to each portal's own internal clock, the said synchronization signal being achieved via the insertion of a control window;
 - of detecting, via each portal, the control windows of other portals and of selecting one of the detected windows for the synchronization of the receiver portal's own clock with the clock of the cycle server portal, the said selected window corresponding to a portal whose clock is already synchronized with that of the cycle server portal.
2. Process according to Claim 1, characterized in that a control window comprises at least a part of a value of the clock of the transmitter portal of the said control window, the said value being that of the clock at the moment of transmission of the said control window, the said value transmitted being used by the receiver portal to update the value of its own clock.
3. Process according to Claim 2, characterized in that the clock value transmitted by a portal comprises a correction for compensating for the processing time of the control window on transmission.
4. Process according to Claims 2 or 3, characterized in that the clock value received by a portal is corrected, before the updating of the value of its own clock, so as to take account of the reception processing time of the said portal.

5 6. Process according to one of the preceding claims, characterized in
that the said clock value is split up into several groups of bits transmitted over
successive control windows transmitted by one and the same portal.

10 5 6. Process according to one of the preceding claims, characterized in
that it furthermore comprises the step of determining, by each portal, its
distance with respect to the cycle server portal, the said distance of a given
portal being defined as being the minimum number of repeater portals required
in order for an item originating from the cycle server portal to reach the said
given portal.

15 7. Process according to Claim 6, characterized in that the control
window chosen by a given portal for synchronizing itself is the control window of
a portal having the shortest distance among the control windows received by
the said given portal.

20 8. Process according to one of the preceding claims, characterized in
that it furthermore includes the step of locking a phase locked loop of a receiver
portal to the instant of reception of the selected control window, the said phase
locked loop being used to increment a register containing the said portal's own
clock value.

25 9. Process according to one of the preceding claims, characterized in
that it furthermore comprises the step of selecting a cycle master node of the
entire communication network from among the nodes connected to the
network, the cycle server portal being the portal connected to the bus to which
the said cycle master node of the network is also connected, the said cycle
server portal synchronizing its own clock to a clock of the said cycle master
node of the network.

30 10. Process according to Claim 9, characterized in that the
communication buses being of the IEEE 1394 type, the synchronization of the
cycle server portal to the cycle master node of the network is performed by way
of cycle start packets transmitted by the said node, the frequency of
transmission of frames over the wireless part of the network being a submultiple
35 of the frequency of transmission of the cycle start packets.

11. Process according to one of the preceding claims, characterized in that a clock belonging to a portal which is not the cycle server portal is used to synchronize the bus to which the said portal is connected.

5 12. Apparatus for interfacing a cable bus and a wireless communication network, characterized in that it comprises:

- means (30, 31, 32) of clock recovery utilizing the said cable bus, these recovery means comprising a phase locked loop for locking onto a periodic signal travelling around the cable bus and a counter for counting an own-clock absolute value, the said counter being linked to a clock derived from the phase locked loop for the incrementation of the said counter, the absolute value of the said counter being synchronized with that of a node connected to the cable bus;

- means of periodic transmission to the wireless communication network of a control window serving as time reference for the other apparatuses connected to the wireless network, the generation of the said control window being bound with the state of the said counter, the said control window comprising an item relating to the state of the said counter at the moment of transmission of the said control window.

20 13. Apparatus for interfacing a cable bus and a wireless communication network, characterized in that it comprises:

- means (40, 41, 42, 47) of clock recovery utilizing a signal transmitted over the said wireless communication network, the said recovery means comprising a phase locked loop and an own-clock register;

- means (μ') for selecting one control window from among a plurality of control windows transmitted over the wireless network;

- means (41) for extracting a synchronization of the said control window for feeding the said phase locked loop;

- means (47) for extracting items relating to the absolute value of a reference clock of the said control window, and for updating the said own-clock register